

Kuniyoshi NAKASHIMA et al., Application No. 10/552,136
Page 2

Dkt. 1141/75270

Listing of Claims

The following listing of claims will replace all prior versions, and listings, of claims in the subject application:

1. (currently amended) A medical image diagnosing support apparatus comprising:

a first extraction means which extracts a body region of a subject from a tomographic image of the subject acquired by a medical tomographic apparatus and removes an epidermal tissue layer region from the body region;

a second extraction means which automatically (a) searches the tomographic image for a predetermined range of CT values corresponding to an abdominal wall muscle layer to determine from a histogram of the CT values in the predetermined range a most frequently occurring CT value in the predetermined range, (b) sets a threshold by utilizing the most frequently occurring CT value in the predetermined range, (c) utilizes extracting, while utilizing the threshold, to extract an abdominal wall muscle layer region as a non-adipose region from the body region from which the epidermal tissue layer region has been removed, and (d) sets a line surrounding the abdominal wall muscle layer region based on positional information of the abdominal wall muscle layer region extracted in (c);

a third extraction means which extracts a total body adipose region from the body region;

a separation means which separates the total body adipose region into a visceral adipose region and a subcutaneous adipose region based on whether a specified region is located inside or outside of the line surrounding the abdominal wall muscle layer region; and

a display control means which controls display of the tomographic image on an image display device with clear indication of the visceral adipose region and the subcutaneous adipose

Kuniyoshi NAKASHIMA et al., Application No. 10/552,136
Page 3

Dkt. 1141/75270

region.

Claims 2 and 3 (canceled).

4. (previously presented) The medical image diagnosing support apparatus according to claim 1, wherein the second extraction means performs peripheral edge recognition processing of the non-adipose region, sets a plurality of attention points on a recognized peripheral edge, and interpolates spaces between the plurality of attention points by higher order spline interpolation to extract an outline of the non-adipose region, wherein the separation means separates the total body adipose region into a visceral adipose region and a subcutaneous adipose region based on the outline of the non-adipose region extracted.

Claim 5 (canceled).

6. (original) The medical image diagnosing support apparatus according to claim 1, wherein the third extraction means extracts the total body adipose region by subtracting the non-adipose region from the body region.

7. (previously presented) The medical image diagnosing support apparatus according to claim 1, further comprising a determination means which determines whether the tomographic image is suitable for body adipose measurement,

wherein the display control means controls to display a determination result by the determination means on the image display device.

Kuniyoshi NAKASHIMA et al., Application No. 10/552,136
Page 4

Dkt. 1141/75270

8. (original) The medical image diagnosing support apparatus according to claim 7, wherein when the determination means obtains error information that the tomographic image is not obtained from a site suitable for body adipose measurement of the subject or not acquired by a predetermined medical tomographic apparatus, the display control means controls to display the error information on the image display device.

9. (previously presented) The medical image diagnosing support apparatus according to claim 1, further comprising an area ratio calculation means which calculates area ratios of the total body adipose region, the visceral adipose region, and the subcutaneous adipose region,

wherein the display control means controls to display the area ratios calculated by the area ratio calculation means on the image display device.

10. (original) The medical image diagnosing support apparatus according to claim 9, further comprising a print output means which prints and outputs the tomographic image and the area ratios controlled to be displayed on the image display device by the display control means.

11. (currently amended) A medical image diagnosing support method comprising:
a first extraction step of extracting, by a medical image diagnosing support apparatus, a body region of a subject from a tomographic image of the subject acquired by a medical tomographic apparatus and removing an epidermal tissue layer region from the body region;
a second extraction step of automatically (a) searching the tomographic image for a predetermined range of CT values corresponding to an abdominal wall muscle layer to determine

Kuniyoshi NAKASHIMA et al., Application No. 10/552,136
Page 5

Dkt. 1141/75270

from a histogram of the CT values in the predetermined range a most frequently occurring CT value in the predetermined range, (b) setting a threshold by utilizing the most frequently occurring CT value in the predetermined range, (c) extracting, while utilizing the threshold, to extract an abdominal wall muscle layer region as a non-adipose region from the body region from which the epidermal tissue layer region has been removed, and (d) setting, by the medical image diagnosing support apparatus, a line surrounding the abdominal wall muscle layer region based on positional information of the abdominal wall muscle layer region extracted in (c);

a third extraction step of extracting, by the medical image diagnosing support apparatus, a total body adipose region from the body region;

a separation step of separating, by the medical image diagnosing support apparatus, the total body adipose region into a visceral adipose region and a subcutaneous adipose region based on whether a specified region is located inside or outside of the line surrounding the abdominal wall muscle layer non-adipose region; and

a display control step of controlling display of the tomographic image on an image display device with clear indication of the visceral adipose region and the subcutaneous adipose region.

Claims 12 and 13 (canceled).

14. (previously presented) The medical image diagnosing support method according to claim 11, wherein peripheral edge recognition processing of the non-adipose region is performed, a plurality of attention points are set on a recognized peripheral edge, and spaces between the plurality of attention points are interpolated by higher order spline interpolation to

Kuniyoshi NAKASHIMA et al., Application No. 10/552,136
Page 6

Dkt. 1141/75270

extract an outline of the non-adipose region in the second extraction step.

Claim 15 (canceled).

16. (original) The medical image diagnosing support method according to claim 11, wherein in the third extraction step, the total body adipose region are extracted by subtracting the non-adipose region from the body region.

17. (previously presented) The medical image diagnosing support method according to claim 11, further comprising a determination step of determining whether the tomographic image is suitable for body adipose measurement,

wherein a determination result by the determination step is controlled to be displayed on the image display device in the display control step.

18. (original) The medical image diagnosing support method according to claim 17, wherein when error information that the tomographic image is not obtained from a site suitable for body adipose measurement of the subject or not acquired by a predetermined medical tomographic apparatus is obtained in the determination step, the error information is controlled to be displayed on the image display device in the display control step.

19. (previously presented) The medical image diagnosing support method according to claim 11, further comprising an area ratio calculation step of calculating area ratios of the total body adipose region, the visceral adipose region, and the subcutaneous adipose region,

Kuniyoshi NAKASHIMA et al., Application No. 10/552,136
Page 7

Dkt. 1141/75270

wherein the area ratios calculated by the area ratio calculation means are controlled to be displayed on the image display device in the display control step.

20. (original) The medical image diagnosing support method according to claim 19, further comprising a print output step of printing and outputting the tomographic image and the area ratios controlled to be displayed on the image display device in the display control step.

21. (previously presented) A medical image diagnosing support apparatus according to claim 1, wherein the separation means extracts a region between a contracted circumscribed circle and a muscle region as the subcutaneous adipose region, when the circumscribed circle, which circumscribes the body region divided radially into predetermined numbers having the barycenter of the body region as the center, is contracted until the circle circumscribes the muscle region which is extracted by performing threshold processing to the body region.

22. (previously presented) The medical image diagnosing support apparatus according to claim 1 further comprising means for extracting a navel region of the subject from the tomographic image of the subject, wherein the separation means extracts a region where muscle and bone region are removed as the subcutaneous adipose region from a portion of the body region included in a circular area of interest in which a radius of the circular area is half of a distance between a first attention point set at a peripheral edge of the non-adipose region and a second attention point set at middle point of each partial region of the muscle and bone region included in the regions where the navel region is removed from the extracted body region.

Kuniyoshi NAKASHIMA et al., Application No. 10/552,136
Page 8

Dkt. 1141/75270

23. (previously presented) The medical image diagnosing support apparatus according to claim 7 further comprising a means for extracting the navel region of the subject from the tomographic image of the subject, wherein the determination means determines that the tomographic image is suitable for body adipose measurement when an air region is within a predetermined ratio and when the navel region is included in the extracted non-adipose region.

24. (previously presented) The medical image diagnosing support apparatus according to claim 1, wherein the second extraction means sets the line surrounding the non-adipose region using peripheral edge recognition processing.

25. (previously presented) The medical image diagnosing support method according to claim 11, wherein the second extraction step sets the line surrounding the non-adipose region using peripheral edge recognition processing.

26. (new) A medical image diagnosing support apparatus comprising:
a first extraction means which extracts a body region of a subject from a tomographic image of the subject acquired by a medical tomographic apparatus and removes an epidermal tissue layer region from the body region;
a second extraction means which extracts a non-adipose region from the body region from which an epidermal tissue layer region has been removed;
a third extraction means which extracts, based on both of the non-adipose region and the body region from which the epidermal tissue layer region has been removed, a total body adipose region from the body region from which the epidermal tissue layer region has been removed;

Kuniyoshi NAKASHIMA et al., Application No. 10/552,136
Page 9

Dkt. 1141/75270

a separation means which separates the total body adipose region into a visceral adipose region and a subcutaneous adipose region based on positional information of the non-adipose region; and

a display control means which controls display of the tomographic image on an image display device with clear indication of the visceral adipose region and the subcutaneous adipose region.